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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

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GROUP 2800

Application Number: 10/044,141

Filing Date: January 11, 2002

Appellant(s): PAEK, JONG SIK

Mark B. Garred
Registration No. 34,823
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on November 4, 2004.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Claimed Subject Matter*

The summary of claimed subject matter contained in the brief is correct.

(6) *Grounds of Rejection to be Reviewed on Appeal*

The appellant's statement of the grounds of rejection in the brief is correct.

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(7) *Claims Appendix*

The copy of the appealed claims contained in the Appendix to be brief is correct.

(8) *Evidence Relied Upon*

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

6,337,510	Chun-Jen et al.	01-2002
JP 05,206,219	Takahashi	08-1993
6,157,074	Lee	12-2000

(9) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

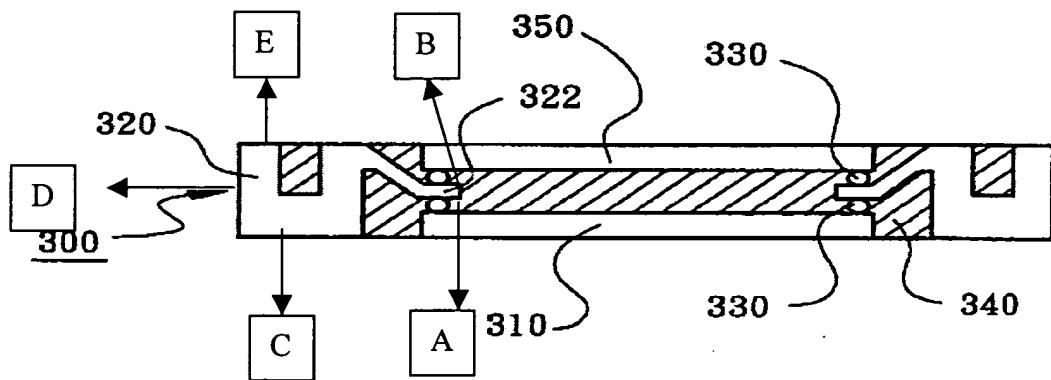
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 ~ 6 and 11 ~ 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Chun-Jen et al. (U. S. Pat. No. 6,337,510).

Regarding claim 1, Chun-Jen et al. discloses in e.g., Fig. 5 a semiconductor package comprising:



Claims

- a plurality of leads, each of the leads defining:
 - * a generally planar first surface;
 - * a generally planar second surface disposed in opposed relation to the first surface; and

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- a plurality of leads (320), each of the leads defining:
 - * a generally planar first surface (A; the generally planar surface area where the solder ball 330 is attached);
 - * a generally planar second surface (B; the generally planar surface area where the solder ball 330 is attached) disposed in opposed relation to the first surface; and

Claims

- * a generally planar third surface disposed in opposed, substantially parallel relation to the second surface and laterally offset outwardly relative to the first surface;
- a first semiconductor die defining opposed top and bottom surface;
- a second semiconductor die defining opposed top and bottom surfaces;
- a plurality of conductive connectors electrically and mechanically connecting the first semiconductor die to the first surfaces of the leads and the second semiconductor die to the second surfaces of the leads; and

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- * a generally planar third surface (C) disposed in opposed, substantially parallel relation to the second surface and laterally offset outwardly relative to the first surface;
- a first semiconductor die (310) defining opposed top and bottom surface;
- a second semiconductor die (350) defining opposed top and bottom surfaces;
- a plurality of conductive connectors (330) made of solder electrically and mechanically connecting the first semiconductor die to the first surfaces of the leads and the second semiconductor die to the second surfaces of the leads; and

Claims

- an encapsulating portion applied to and at least partially encapsulating the leads, the first and second semiconductor dies, and the conductive connectors such that at least the first and second surfaces of each of the leads are covered by the encapsulating portion.

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- an encapsulating portion (molding compound 340) at least partially encapsulates leads 320 as well as first and second semiconductor dies 310, 350 and the conductive connectors 330 such that the first and second surfaces A and B of the leads are covered; see e.g., Fig. 5) applied to and at least partially encapsulating the leads, the first and second semiconductor dies, and the conductive connectors such that at least the first and second surfaces of each of the leads are covered by the encapsulating portion.

Regarding claim 2, wherein the conductive connectors each comprise a conductive bump.

Regarding claim 2, Chun-Jen et al. discloses in Fig. 5 and column 3, line 62 the conductive connectors each comprising a conductive bump (330).

Claims

Regarding claim 3, wherein the conductive bump is fabricated from material selected from the group consisting of: gold; and solder.

Regarding claim 4, wherein:

- the first semiconductor die includes a plurality of bond pads disposed on the top surface thereof;
- the second semiconductor die includes a plurality of bond pads disposed on the bottom surface thereof; and

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Regarding claim 3, Chun-Jen et al. discloses in Fig. 5 and column 2, line 38 the conductive bump (330) being fabricated from material selected from solder.

Regarding claim 4, Chun-Jen et al. discloses in Fig. 5:

- the first semiconductor die (310) includes a plurality of bond pads (an area directly under the solder ball 330, at the top) disposed on the top surface thereof;
- the second semiconductor die (350) includes a plurality of bond pads (an area directly under the solder ball 330, at the bottom) disposed on the bottom surface thereof; and

Claims

- the conductive connectors are used to electrically and mechanically connect the bond pads of the first semiconductor die to respective ones of the first surfaces of the leads and the bond pads of the second semiconductor die to respective ones of the second surfaces of the leads.

Regarding claim 5, wherein the conductive connectors each comprise a conductive bump.

Regarding claim 6, wherein:

- each of the leads includes a first bump land formed at a prescribed region of the first surface thereof and a second bump land formed at a prescribed region of the second surface thereof;

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- the conductive connectors (330) are used to electrically and mechanically connect the bond pads of the first semiconductor die to respective ones of the first surfaces of the leads and the bond pads of the second semiconductor die to respective ones of the second surfaces of the leads.

Regarding claim 5, Chun-Jen et al. discloses in Fig. 5 the conductive connectors each comprising a conductive bump.

Regarding claim 6, Chun-Jen et al. discloses in Fig. 5:

- each of the leads (320) includes a first bump land formed at a prescribed region of the first surface thereof and a second bump land formed at a prescribed region of the second surface thereof;

Claims

- the conductive connectors each comprise a conductive bump; and
- the conductive bumps are fused to respective ones of the first and second bump lands of each of the leads.

Regarding claim 11, wherein the first and second semiconductor dies are identically sized.

Regarding claim 12, wherein the encapsulating portion being applied to the leads such that the third surface of each of the leads is exposed within the encapsulating portion.

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- the conductive connectors (330) each comprise a conductive bump; and
- the conductive bumps are fused to respective ones of the first and second bump lands of each of the leads.

Regarding claim 11, Chun-Jen et al. discloses in Fig. 5 the first and second semiconductor dies being identically sized.

Regarding claim 12, Chun-Jen et al. discloses in Fig. 5 the encapsulating portion being applied to the leads such that the third surface of each of the leads is exposed within the encapsulating portion.

Claims:

Regarding claim 13, wherein the encapsulating portion is applied to the first and second semiconductor dies such that the bottom surface of the first semiconductor die and the top surface of the second semiconductor die are each exposed within the encapsulating portion.

Regarding claim 14, wherein the leads and the first semiconductor die are oriented relative to each other such that the bottom surface of the first semiconductor die is substantially flush with the third surface of each of the leads.

Regarding claim 15, wherein:

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Regarding claim 13, Chun-Jen et al. discloses in Fig. 5 the encapsulating portion (340) being applied to the first and second semiconductor dies such that the bottom surface of the first semiconductor die and the top surface of the second semiconductor die are each exposed within the encapsulating portion.

Regarding claim 14, Chun-Jen et al. discloses in Fig. 5 the leads and the first semiconductor die being oriented relative to each other such that the bottom surface of the first semiconductor die is substantially flush with the third surface of each of the leads.

Regarding claim 15, Chun-Jen et al. discloses in Fig. 5

Claims

- each of the leads further defines an outer end which extends between the second and third surfaces thereof; and

- the encapsulating portion is applied to the leads such that the outer end of each of the leads is exposed within the encapsulating portion.

Regarding claim 16, wherein each of the leads further defines a fourth surface disposed in opposed relation to the third surface and laterally offset outwardly relative to the second surface.

Chun-Jen et al.

- each of the leads (320) further defines an outer end (D) which extends between the second and third surfaces thereof; and

- the encapsulating portion is applied to the leads such that the outer end of each of the leads is exposed within the encapsulating portion.

Regarding claim 16, Chun-Jen et al. discloses in Fig. 5 each of the leads (320) further defines a fourth surface (E) disposed in opposed relation to the third surface and laterally offset outwardly relative to the second surface.

Claims

Regarding claim 17, wherein the encapsulating portion is applied to the leads such that the third and fourth surfaces of each of the leads are exposed within the encapsulating portion.

Chun-Jen et al.

Regarding claim 17, Chun-Jen et al. discloses in Fig. 5 the encapsulating portion being applied to the leads such that the third and fourth surfaces of each of the leads are exposed within the encapsulating portion.

Regarding claim 18, wherein the encapsulating portion is applied to the first and second semiconductor dies such that the bottom surface of the first semiconductor die and the top surface of the second semiconductor die are each exposed within the encapsulating portion.

Regarding claim 18, Chun-Jen et al. discloses in Fig. 5 the encapsulating portion being applied to the first and second semiconductor dies such that the bottom surface of the first semiconductor die and the top surface of the second semiconductor die are each exposed within the encapsulating portion.

Claims

Regarding claim 19, wherein the second semiconductor die and the leads are oriented relative to each other such that the top surface of the second semiconductor die is substantially flush with the fourth surface of each of the leads.

Regarding claim 20, wherein the first semiconductor die and the leads are oriented relative to each other such that the bottom surface of the first semiconductor die is substantially flush with the third surface of each of the leads.

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Regarding claim 19, Chun-Jen et al. discloses in Fig. 5 the second semiconductor die and the leads being oriented relative to each other such that the top surface of the second semiconductor die is substantially flush with the fourth surface of each of the leads.

Regarding claim 20, Chun-Jen et al. discloses in Fig. 5 the first semiconductor die and the leads being oriented relative to each other such that the bottom surface of the first semiconductor die is substantially flush with the third surface of each of the leads.

Claims

Regarding claim 21, further in combination with a second semiconductor package identically configured to the semiconductor package, the third surfaces of the leads of the second semiconductor package being electrically connected to respective ones of the fourth surfaces of the leads of the semiconductor package.

Chun-Jen et al.

Regarding claim 21, Chun-Jen et al. discloses in Fig. 3, Fig. 5 and column 3, line 56 ~ column 4, line 2 further in combination with a second semiconductor package identically configured to the semiconductor package, the third surfaces of the leads of the second semiconductor package being electrically connected to respective ones of the fourth surfaces of the leads of the semiconductor package.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chun-Jen et al. in view of Takahashi (JP-05206219).

Regarding claims 7 and 9, Chun-Jen et al. discloses the claimed invention except for each of the leads including first and second protective layers on the bump land. However, Takahashi teaches in e.g., Fig. 1, Fig. 3 and abstract, lines 1 – 28 each of the leads (10) including a first protective layer (13, at the left) coated on the first surface thereof about a respective one of conductive connectors (17); and a second protective layer (13, at the right) coated on the second surface thereof about a respective one of conductive connectors (17). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Chun-Jen et al. by using first and second protective layers as taught by Takahashi. The one of ordinary skill in the art would have been motivated to modify Chun-Jen et al. in the manner described above for at least the purpose of preventing short-circuit (abstract, lines 26 ~ 28).

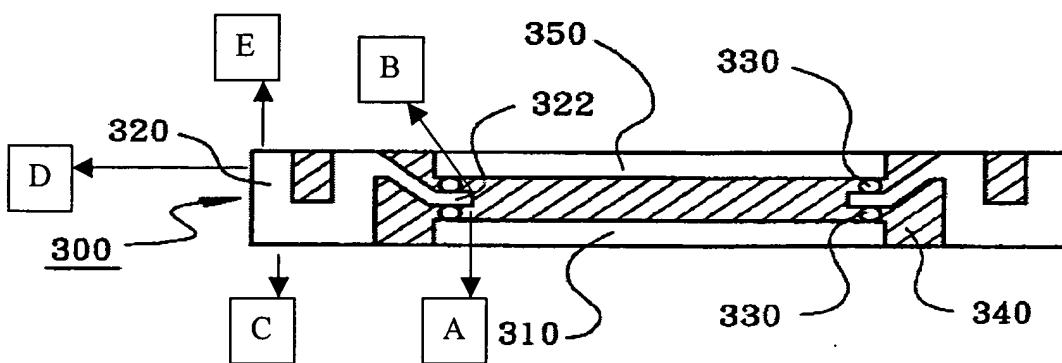
Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chun-Jen et al. and Takahashi as applied to claims 7 and 9 above, and further in view of Lee ‘074.

Regarding claims 8 and 10, while Takahashi teaches the use of the lead finger protective layers, Takahashi does not appear to provide any example of the protective layer’s specific composition. Lee teaches in e.g., Fig. 12 and column 7, lines 58 – 60 the protective layers (11) may be composed of a polyimide. It would have been obvious to one of ordinary skill in the art at the time when the invention was made to apply the polyimide as the specific material to form the protective layers on the lead fingers of Chun-Jen et al. and Takahashi as taught by Lee to prevent electrical coupling between the chip and the lead fingers (column 8, lines 37 – 40).

(11) Response to Argument

Response to arguments against the 35 U.S.C. § 102 (e) rejection.

On page 6, Appellant argues “Appellant’s independent Claim 1, recites, *inter alia*, ... a generally planar third surface disposed in opposed, substantially parallel relation to the second surface and laterally offset outwardly relative to the first surface; ... CHUN-JEN does not teach the aforementioned feature.” This argument is not persuasive. The claim requires that the third surface is opposed to the second surface AND laterally offset from the first surface. Appellant concedes that the third surface C is laterally offset from the first surface A since C is closer to the edge than is A (see Appeal Brief, page 6). Furthermore, the claim also requires that the second surface B is *opposed* to the first surface A which is met since A is facing downward and B is facing upward or it is met since A and B are on opposite sides of an imaginary center line. Note also that appellant must concede the relationship between A and B as it is, since it is not argued. As such, it is not clear how C, which is laterally offset from A and, like A, is facing downward (or, like A is on the opposite side of the imaginary center line), is not *opposed* to B.



Therefore, there is no reason to believe that the third surface (C) of CHUN-JEN is not an opposite surface of the second surface (B) of CHUN-JEN. Because CHUN-JEN provides a third surface (C) in the physical arrangement as claimed, it is considered to meet the structural limitations of the claim and the argument is not persuasive.

Furthermore, Appellant argues “the present invention has several notable advantages over CHUN-JEN. First, it is noted that the present invention provides a more compact package than CHUN-JEN ... the leads 130 present invention can be manufactured more economically than the leads 320 taught by CHUN-JEN. Thus, overall, it is noted that the present invention provides a more compact package, while at the same time being less expensive to manufacture as compared to the CHUN-JEN package.” This argument is not persuasive because mere recognition of advantage in the present invention over the prior art cannot be the basis for patentability. *In re Wiseman*, 596 F.2d 1019, 201 USPQ 658 (CCPA 1979).

For the above reasons, CHUN-JEN shows in Fig. 5 *a generally planar third surface (C) disposed in opposed, substantially parallel relation to the second surface (B) and laterally offset outwardly relative to the first surface (A)*, as recited in claim 1 of the instant application.

Next, Appellant argues “dependent Claims 2 – 6 and 11 – 21 are allowable at least for the reason that these claims depend from allowable independent Claim 1.” This argument is not persuasive. Because the rejection for the independent Claim 1 is considered to meet the structural limitations of the claim and the argument is not persuasive, the dependent Claims 2 – 6 and 11 –

21 are not allowable at least for the reason that these claims depend from non-allowable independent Claim 1.

For all the reasons provided above, a *prima facie* case of claims 1 – 6 and 11 – 21 has been established pursuant to the requirements of 35 U.S.C. section 102 (e). Therefore, the rejection of claims 1 – 6 and 11 – 21 is proper, and the Appellant’s arguments for their reversal are not persuasive.

Response to arguments against the 35 U.S.C. § 103(a) rejection.

On page 10, Appellant argues “Although TAKAHASHI does teach applying an insulative coating film 13 to each of the leads 10, TAKAHASHI does not teach forming a protective layer on a surface of a lead other than for the prescribed region including a bump land.” This argument is not persuasive. First, Takahashi clearly shows in e.g., Fig. 1, Fig. 3 and abstract, lines 1 – 28 each of the leads (10) including a first protective layer (13, at the left) coated on the first surface thereof about a respective one of conductive connectors (bumps 17); and a second protective layer (13, at the right) coated on the second surface thereof about a respective one of conductive connectors (bumps 17). In other words, the protective layer (13) is formed on a surface of a lead (10) other than for the prescribed region including a bump land (at the area under the bumps 17). Also, Appellant argues that TAKAHASHI does not teach initially configuring the film 13 to define a land. The gist of Appellant’s arguments against the obvious rejection is primarily based on the manufacturing differences between the protective layer of Takahashi and that the instant invention. However, this is not an issue with respect to the claimed invention. This is because the

invention, as set forth in the claims, is clearly directed to an apparatus. Nowhere do the limitations of the claims define the process in which the instant invention is to be manufactured. Thus, such arguments clearly fail to distinguish the claimed invention from the disclosure of Takahashi and Chun-Jen et al.

Furthermore, Appellant argues “it is also noted that the present invention has another advantage over the TAKAHASHI reference … Thus, Applicant submits that the present invention provides a more reliable manner to electrically connect leads to the dies than does TAKAHASHI.” This argument is not persuasive because mere recognition of advantage in the present invention over the prior art cannot be the basis for patentability. *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

For the above reasons, CHUN-JEN and TAKAHASHI discloses *a first protective layer* (13, at the left) *formed on at least a portion of the first surface thereof other than for the prescribed region including the first bump land* (at the area under the bumps 17); *and a second protective layer* (13, at the right) *formed on at least a portion of the second surface thereof other than for the prescribed region including the second bump land* (at the area under the bumps 17), as recited in dependent claim 7 of the instant application.

On page 12, the gist of Appellant’s arguments against the obvious rejection is primarily based on the manufacturing differences between the protective layer of Takahashi and that the instant invention. However, as explained in the previous paragraphs, this is not an issue with respect to the claimed invention. This is because the invention, as set forth in the claims, is

clearly directed to an apparatus. Nowhere do the limitations of the claims define the process in which the instant invention is to be manufactured. Thus, such arguments clearly fail to distinguish the claimed invention from the disclosure of Takahashi and Chun-Jen et al.

Furthermore, Appellant argues “it is also noted that the present invention has another advantage over the TAKAHASHI reference … Thus, Applicant submits that the present invention provides a more reliable manner to electrically connect leads to the dies than does TAKAHASHI.” This argument is not persuasive because mere recognition of advantage in the present invention over the prior art cannot be the basis for patentability. *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

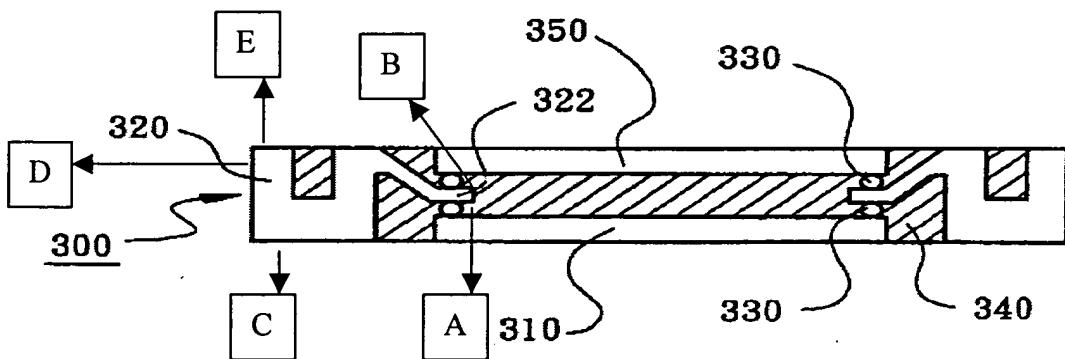
For the above reasons, CHUN-JEN and TAKAHASHI discloses a first protective layer (13, at the left) coated on the first surface thereof about a respective one of the conductive connectors (the bumps 17); and a second protective layer (13, at the right) coated on the second surface thereof about a respective one of the conductive connectors (the bumps 17), as recited in dependent claim 9 of the instant application.

Next, Appellant argues “dependent Claims 8 and 10 are allowable at least for the reason that these claims depend from allowable independent Claims 7 and 9.” This argument is not persuasive. Because the rejection for the dependent Claims 7 and 9 are considered to meet the structural limitations of the claim and the arguments are not persuasive, the dependent Claims 8 and 10 are not allowable at least for the reason that these claims depend from non-allowable the dependent Claims 1, 7 and 9.

For all the reasons provided above, a prima facie case of obviousness of claims 7 – 10 has been established pursuant to the requirements of 35 U.S.C. § 103 (a). Therefore, the rejections to claims 7 – 10 are proper, and the Appellant's arguments for their reversal are not persuasive.

(11) Conclusion

Appellant's arguments that the third surface of CHUN-JEN et al. is not disposed in opposed substantially parallel relation to the second surface are not seem to be reasonable. As explained in the above paragraphs, CHUN-JEN et al. discloses (see the figure at the bottom of this page) the third surface (C) disposed in opposed substantially parallel relation to the second surface (B). Thus, Appellant's arguments that the third surface of CHUN-JEN et al. is not disposed in opposed substantially parallel relation to the second surface are not persuasive.



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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Art Unit 2815

c.c.

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